REMARKS

Reconsideration of this application is respectfully requested in view of the foregoing amendment and the remarks that follow.

Applicant has modified the abstract to reduce the number of words to make the abstract compliant with Examiner's reminder.

CLAIM REJECTIONS - Double Patenting

Claim 1 - 26 are rejected under the judicially created doctrine of double patenting over claims of U.S. Patent No. 6,311,571. Applicant includes a terminal disclaimer herewith.

CLAIM REJECTIONS - 35 USC § 102(b)

Independent Claim 12 and Dependent Claims 13 and 16

Independent Claim 12 and Claims 13 and 16 which are dependent on Claim 12 were rejected under 35 USC § 102(b) as being anticipated by Husby.

Regarding Independent Claim 12 Examiner Asserts:

> Regarding claim 12, Husby discloses a seat belt tension sensor with features of the claimed invention including an anchor, a flexible member (element 36), a tension receiver and sensing means (element 35) for generating an electrical signal indicative of belt tension.

Applicant's response to rejection of
Independent Claim 12

This rejection is respectfully traversed for the reasons set forth below.

Claim 12 as amended recites a "moving arm force responder" which "comprises a base affixed to an arm,

force from said belt is applied to said base in the direction of an axis,

said base is adapted to flex upon said application of said force,

said arm extends from said base substantially parallel with said axis, and

said flexing urges said arm to move relative to said sensor,"

Applicant respectfully submits that Husby does not disclose a base "affixed to an arm" and wherein "force from said belt is applied to said base in the direction of an axis" and "said arm extends from said base substantially parallel with said axis" as recited in Applicant's amended Claim 12.

It is respectfully submitted that Claim 12 is in condition for allowance and favorable action is requested. It is further submitted that Claims 13 and 16, which are dependent on Claim 12, should be allowed with Claim 12.

Independent Claim 18 and Dependent Claim 19

Independent Claim 18 and dependent claim 19 were rejected under 35 USC § 102(b) as being anticipated by either Sikorra or Diaz et al.

Regarding Independent Claim 18 Examiner Asserts:

> Regarding claim 18, both cited art show a load sensor with features of the claimed invention including a tension receiver a moving arm comprises two arms, such the variation of distance between them is an indicative of applied force.

Applicant's Traverse of Examiners Rejection based on Sikorra

Applicant believes Examiner's rejection is based on Figures 1 and 2 of Sikorra which illustrate "a typical strain gauge" (Column 2 lines 39 - 46). Figures 1 and 2 illustrate a prior art "strain gauge" which has the purpose of measuring the amount of stretch or compression at the surface of the specimen 20 (column 2 line 60 through column 3 line 60). Figures 1 and 2 of Sikorra and the aforementioned 60 lines of text illustrate and describe deficiencies in prior art strain gauges like the strain gauge illustrated in Figures 1 and 2 that are corrected by Sikorra's invention. Strain is defined (column 3 line 24) as delta L divided by L of the specimen. Strain is not force. Therefore, unlike Applicant, Sikorra does not illustrate a "force sensor". Applicant respectfully submits that Applicant's Claim 18 as amended is distinguished from the art taught by Sikorra by the first line of Claim 1 which recites "A force sensor comprising".

Further, the third paragraph of Applicant's Claim 18 as amended recites

> said moving arm force responder comprises a base having a first surface adapted to receive a first force perpendicular to said first surface

Sikorra does not describe a surface on the specimen 20 adapted to receive a force.

Applicant respectfully submits that Applicant's invention as defined by Applicant's Claim 18 as amended is not described by the Sikorra patent.

Applicant's response to rejection based on Diaz et al.

This rejection is respectfully traversed for the reasons set forth below.

Independent Claim 18

Diaz et al. describe a "method for measuring and controlling the crack growth rate within a double cantilever beam type test specimen" (Recited in the abstract). It differs from the prior art illustrated in Figure 1 in that force is applied between the beams by pressure actuated bellows and sensors measure the deflection of the beam so that it can be tested in locations where conditions preclude observation by humans.

It is respectfully submitted that Diaz et al. does not describe Applicant's invention as defined by Applicant's Claim 18 as amended for the following reasons:

a) The first paragraph of Applicant's Claim 18 as amended recites "A force sensor". The invention of Diaz et al. is "apparatus for measuring and controlling crack growth". Nowhere in Diaz et al. is the output of the sensors described as indicating a force. Nowhere in Diaz et al. is the device described as capable of sensing force.

b) The third paragraph of Applicant's Claim 18 as amended recites "said moving arm force responder comprises a base having a first surface adapted to receive a first force perpendicular to said first surface". The only part in Diaz et al. that could correspond to Applicant's base is the end of specimen body 17. No surface at the end of specimen body 17 is adapted to receive a force perpendicular to the surface. The following presents additional detail.

The part in Diaz et al. corresponding to the moving arm force responder of Applicant's Claim 18 is the combination of beams 12 and 14 with specimen body 17. Beams 12 and 14 correspond to the arms of Applicant's moving arm force responder and the end of specimen body 17 corresponds to the base. There is no surface on the end of specimen body 17 of Dias et al. that is adapted to receive a force to be sensed. The only force applied to the end of specimen body 17 of Diaz et al. is the force applied by the beams 12 and 14 and that force is not applied to a surface of the specimen body 17.

c) The last paragraph of Applicant's Claim 18 as amended recites "said sensor is responsive to said arms by generating an electric signal indicating said first force". Diaz et al. fails to meet this restriction because the "said first force" is the force defined in the third paragraph of Applicant's Claim 18 to be applied perpendicular to "said first surface" is not defined in Diaz et al. because there is no "first surface" in Diaz et al. perpendicular to which a force is applied. Also, in Applicant's claimed invention the electric signal indicates "said first force". In operation of Diaz et al., the output signal indicates (column 11 lines 14 - 19):

> Fluid pressure is applied to the bellows 161 from a controlled pressure source (not shown), thereby forcing the beams 152 and 154 to deflect. As the beams deflect, the capacitances of the pairs of capacitive electrodes located on the beams vary with the amount of deflection occurring at each respective pair.

Diaz et al. uses the outputs of the capacitance measurements to determine the crack growth, not applied force. In column 11 lines 22 - 30 Diaz et al. recites:

> Applying conventional beam theory, i.e., the beam curvature being a function of the applied load, the amount of load being applied to the beams of the sensor 150 may be calculated. A determination of the applied load takes into account the crack length, which, as previously disclosed, can be calculated by the potential drop method using the techniques disclosed in the Coffin and Solomon patents.

In other words, Diaz et al. use the known load applied by fluid bellows 161 pressurized with a known fluid pressure and the collective outputs of the pairs of capacitance sensors to determine the progress of crack 158 (refer to figure 5). The only applied force is applied by the pressurized bellows and is applied to the ends of the beams 12 and 14, not to the end of the specimen body 17.

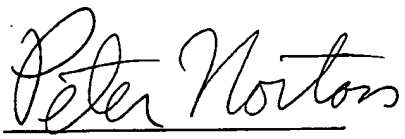
Applicant respectfully submits that the teachings of Diaz et al. do not describe Applicant's invention as defined by Applicant's Claim 18.

It is respectfully submitted that Claim 18 as amended is in condition for allowance and favorable action is requested. It is further submitted that Claims 19 through 26, which are dependent on Claim 18, should be allowed with Claim 18.

CONCLUSION

It is submitted that all claims are now in condition for allowance and favorable action is respectfully solicited.

Respectfully submitted,



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Markup illustrating amendments to the abstract.

ABSTRACT

A seat belt tension sensor has an anchor [, seat belt tension receiver,] and a sensor responsive to a moving arm force responder [, and an arm sensor]. [The seat belt tension receiver applies force from a seat belt to the force responder.] The moving arm force responder is [made of] spring sheet metal bent to [have] form a base for receiving force and one or two arms that [are urged to move by] the received force causes to be urged to move relative to the arm sensor. The arm sensor responds to the arm or arms by generating an electric signal indicating belt tension. [The anchor has an opening through which a seat belt, the seat belt tension receiver and the force responder pass]. A cross member of the anchor spans [the] an opening in the anchor [and withstands the large forces applied by the seat belt when the vehicle strikes an obstacle]. An edge of the cross member [is grooved to engage] engages the base of the moving arm force responder [in a way that provides] and is shaped to provide low friction [during flexing of] when the base flexes. [The base of the force responder operates as a low friction bearing for the movement of the seat belt tension receiver. A flexible suspension element made of spring metal operates as a second bearing and also operates as a preloading spring]. In a preferred embodiment, the arm sensor comprises a [semiconductor] capacitance sensor responsive to the capacitance between two capacitor plates and two arms of a force responder. In a second preferred embodiment, the arm sensor [comprises two permanent magnets movable with the arms of a force responder and] includes a magnetic field sensor.

Markup illustrating amendments to Claim 12

12. (Amended) A belt tension sensor comprising:

[an anchor, said anchor comprising a cross member,]

[a flexible member,]

[a tension receiver] a moving arm force responder, and

[sensing means for] a sensor responsive to said moving arm force responder by generating an electric signal indicating belt tension, and wherein:

[said flexible member is connected with said cross member for applying force thereto] said moving arm force responder comprises a base affixed to an arm,

[said tension receiver is adapted for receiving belt tension,

said tension receiver is connected with said flexible member for applying thereto force derived from said belt tension,

said flexible member is responsive to said force received from said tension receiver by flexing, and]

force from said belt is applied to said base in the direction of an axis,

said base is adapted to flex upon said application of said force,

said arm extends from said base substantially parallel with said axis, and

said flexing urges said arm to move relative to said sensor, whereby

said [sensing means is responsive] sensor responds to said flexing of said [flexible member] base by generating said electric signal.

Markup illustrating amendments to Claim 13

13. (Amended) The invention as defined by Claim 12, including

means for selecting the component of [said] force from a belt [received by said tension receiver] in the direction of an axis from other components of said force from a belt [received by said tension receiver], and wherein[:]

[said tension receiver is movable with respect to said anchor in the direction of said axis, and]

said force from said belt applied to said [flexible member by said tension receiver] base comprises said axial component.

Markup illustrating amendments to Claim 14

14. (Amended) The invention as defined by Claim 13 wherein said means for selecting the component of force comprises:

a tension receiver movable in the direction of said axis, and [including:]

low friction bearing means for bearing said movement of said tension receiver [relative to said anchor] in the direction of said axis[, and wherein:

said means for selecting comprises said bearing means].

Markup illustrating amendments to Claim 15

15. (Amended) The invention as defined by Claim 14 wherein:

said low friction bearing means comprises [a first flexible suspension means] said base engaging both [said] an anchor and said tension receiver.

Markup illustrating amendments to Claim 16

16. (Amended) The invention as defined by Claim 12 and [including:

an arm, and] wherein:

[said flexible member is linked with said arm for moving said arm consequent to said flexing, and]

said [sensing means] sensor is responsive to the position of said arm.

Markup illustrating amendments to Claim 18

18. (Amended) A force sensor comprising:

[a tension receiver,] a sensor and a moving arm force responder, and wherein:

said moving arm force responder comprises a base having a first surface adapted to receive a first force [from said tension receiver] perpendicular to said first surface,

said moving arm force responder also comprises two arms[, there is a distance between said arms, and said distance depends on said force received from said tension receiver, and including] each extending from said base in a direction perpendicular to said first surface,

said base is adapted to respond to said first force by flexing,

said flexing causes said base to urge said arms to move relative to each other, and,

[means] said sensor is responsive to said [distance] arms by generating an electric signal indicating said first force [received from said tension receiver].

Markup illustrating amendments to Claim 19

19. (Amended) The invention as defined by Claim 18 and [including:] wherein:

said sensor comprises a capacitance sensor and two capacitor elements, [and wherein:]

there is a first capacitance between one of said two capacitor elements and one of said two arms, [said arms are electrically connected,]

there is a second capacitance between the other of said two capacitor elements and the other of said two arms,

said arms are electrically connected to each other,

said capacitance sensor is connected to said capacitor elements for sensing the capacitance therebetween, and

said capacitance sensor is adapted to generate a signal responsive to said capacitance between said capacitor elements, [and] whereby

said signal responsive to said capacitance is said electric signal.

Markup illustrating amendments to Claim 20

20. (Amended) The invention as defined by Claim 18 and [including:] wherein:

said sensor comprises a permanent magnet and a magnetic field sensor, [and wherein:]

said permanent magnet provides a magnetic field between said arms, and

[said magnetic field depends on said distance,]

said magnetic field sensor is adapted to generate a signal responsive to said magnetic field between said arms, [and] whereby

said signal responsive to said magnetic field is said electric signal.

Markup illustrating amendments to Claim 22

22. (Amended) The invention as defined by Claim 21 wherein:

[said base is adapted to flex in response to said force received from said tension receiver, and]

said base and said groove are adapted to minimize friction between said base and said salient edges during said flexing.

Markup illustrating amendments to Claim 23

23. (Amended) The invention as defined by Claim 21 wherein;

when said first force [received from said tension receiver] is small, a gap delimited by said salient edges exists between said base and said groove, and

there is a predetermined level of said first force [received from said tension receiver] above which said base and said groove abut at points between said salient edges.

Markup illustrating amendments to Claim 24

24. (Amended) The invention as defined by Claim 18, and including:

a tension receiver,

an anchor, and

a first bearing means, and wherein:

said tension receiver is movable in the direction of an axis,

said first bearing means bears said tension receiver in said movement, and

said first bearing means comprises first flexible suspension means engaging said anchor and said tension receiver.